



CANNAEORCHIS, A NEW GENUS OF DENDROBIINAE (ORCHIDACEAE) FOR THE TAXON PREVIOUSLY KNOWN AS DENDROBIUM SW. SECT. MACROCLADIUM SCHLTR.

by

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ABSTRACT:

The new genus *Cannaeorchis*, endemic to New Caledonia, is described to account for the group of species previously treated under *Dendrobium* Sw. sect. *Macrocladium* Schltr., following a phylogenetic analysis of *Dendrobium* Sw. subgen. *Xerobium* Schltr. (Dendrobiinae: Orchidaceae). *Cannaeorchis* is characterised and circumscribed and the taxonomy, habitat and ecology details are provided for the 11 described species.

Results of a phylogenetic analysis of *Dendrobium* Sw. subgenus *Xerobium* Schltr. (Clements in prep.), provide strong support for the recognition of sections *Aporum* (Blume) Lindl., *Oxystophyllum* (Blume) Miq., *Grastidium* (Blume) J.J. Smith, *Eriopexis* Schltr., *Pleianthe* Schltr., *Macrocladium* Schltr., *Monanthos* Schltr., *Herpethophytum* Schltr. and *Macrocladium* Schltr., at generic rank as distinct from *Dendrobium sensu stricto*.

Section *Macrocladium* was described and characterised by Schlechter (1906) based on terrestrial habit, tall woody stems, distichous leaves and lateral, single-to multi-flowered racemes. He cited *Dendrobium sarcochilus* A. Finet, *D. fractiflexum* A. Finet and *D. steatoglossum* Rchb.f. as characteristic of the group, but was doubtful about the inclusion of another New Caledonian species, *D. finetianum* Schltr. within the taxon. He also described *D. cymatolegum* Schltr. and the variety *major* Schltr. in that publication. In his treatment of *D.* subgenus *Xerobium* (Schlechter 1911-14), Schlechter reaffirmed his original concept of the group whilst suggesting the possible inclusion of *D. cunninghamii* Lindl. from New Zealand. The latter species has since been segregated into the monotypic genus *Winika* (Clements, Jones & Molloy 1997).

Most modern botanists when dealing with *Dendrobium sens. lat.*, agree with Schlechter's treatment of these orchids. Brieger (1981), however, in his revision of the Dendrobiinae, preferred instead to include section *Macrocladium*, as a section within his broad concept of *Grastidium* Blume. The results of a

phylogenetic analysis of *D.* subgenus *Xerobium* (Clements in prep.) do not support Brieger's concept of the taxon.

The purpose of this paper is to describe and characterise *D.* sect. *Macrocladium* at generic rank, to review the taxonomy and status of all species within the genus, provide data on their ecology and distribution and a key to species.

MATERIALS AND METHODS

The materials and methods used are the same as those described by Clements and Jones (1997).

TAXONOMY

Cannaeorchis M.A. Clem. et D.L. Jones, genus novum affinis *Kinetochilo* (Schltr.) Brieg. a qua habitu terrestri, radicibus verrucosis carnosis crassis, caulibus erectis cannoideis usque 5 m altis, et labello basi articulado sed non libere mobile differt.

Type species: *Dendrobium fractiflexum* A. Finet

Synonyms: *Dendrobium* Sw. sect. *Macrocladium* Schltr., Bot. Jahrb. 39: 68 (1906); *Grastidium* Blume sect. *Macrocladium* (Schltr.) Brieger in Schltr., Die Orchideen (ed. 3) 1(11-12): 653 (1981). Type species: *Dendrobium sarcochilus* A. Finet, *D. fractiflexum* A. Finet and *D. steatoglossum* Rchb.f.

Terrestrial herbs, sympodial. Protocorm discoid-conical, the primary roots arising from stem nodes. Roots long-creeping, thick, fleshy, slightly to strongly verrucose, terete to flattened, much-branched. Stems slender, terete or slightly laterally flattened, cane-like or bamboo-like, pseudo-

indeterminate, simple or branched, rarely bearing aerial growths, older parts covered with persistent leaf sheaths. Leaves one per node, alternate, distichous; sheathing base tubular, encircling the stem; lamina sessile, thinly coriaceous, green or purplish, twisted at the base and aligned more or less in a flat plane, apex unequally emarginate. Inflorescence racemose, rarely a sparse panicle, consisting of a thin wiry peduncle and rachis and thicker pedicels, lateral or rarely terminal, single or multi-flowered, when lateral arising at right angles to the stem, leaf opposed, flowers alternate, opening sequentially from the base, evenly spaced; flowering irregularly; flowers resupinate, opening widely, dull or sometimes colourful, long-lived. Dorsal sepal free, similar in shape and size to lateral sepals. Lateral sepals united basally to each other and to the column foot, similar to the dorsal sepal. Petals free, slightly shorter and narrower than the sepals. Mentum consisting of the bases of the lateral sepals and the margins of the column foot. Labellum free, hinged to the base of the column foot, protruding conspicuously from the perianth; lamina entire or three-lobed, often fleshy, much longer than wide, margins entire or convolute. Callus consisting of 3-5 thickened central ridges extending along most of the lamina, often with radiating lateral lines. Column fused completely; column wings fused to the column, the apical extensions projecting and flanking the anther. Column foot as long as or longer than the column, curved, ending in a small shallow sac. Anther incumbent. Pollinia 4 in 2 pairs, waxy. Stigma entire, deeply sunken, with a projecting basal flange. Rostellum ventral, broad. Capsule narrowly obovoid, pendulous, lacking ornamentation, dehiscing by slits. (Fig. 1).

A genus of c. 11 species, endemic to New Caledonia including some off-shore islands, and confined almost exclusively to maquis vegetation and the margins of stunted rainforest on areas of ultrabasic rock. All species are terrestrial in habit, rarely occurring as epiphytes on the base of trees or shrubs.

Etymology: The name chosen is based on use of the common name in New Caledonia for members of this group, viz 'Orchidée à canne', or 'Canne dendrobes' (Hallé 1977). If elevated to generic rank, the name *Macrocladium* was considered too

similar to the palm genus *Macrocladus* Griffith.

Characteristics: *Cannaeorchis* is easily separated from *Dendrobium sens. str.* with which it has been included by various authors. Key characters are:-

- 1) roots thick, fleshy, mostly verrucose;
- 2) stems cane-like or bamboo-like, of pseudo-indeterminate length, purple-brown during early developmental phase;
- 3) inflorescences lateral or occasionally terminal, emerging from a node opposite a leaf lamina and breaking through its leaf sheath;
- 4) inflorescences consisting of a thin wiry peduncle and rachis and thicker pedicels;
- 5) flowers alternate, opening sequentially, usually the basal flowers first, spread out more or less evenly along the rachis and facing outwards;
- 6) labellum lamina entire or three-lobed, much longer than wide, margins entire or crenulate;
- 7) lamina callus consisting of 3, rarely 5, thickened central ridges extending for most of the length of the labellum; and
- 8) protocorm discoid-conical type.

Key to species

1. Plants lacking the ability to produce more than 2 flowers per raceme 2
Racemes multiflowered (usually 4-c. 40) ... 4
2. Flowers white; labellum spatulate .. *C. delumbe*
Flowers green or reddish; labellum narrowly oblong 3
3. Leaves c. 20 mm wide; flowers
c. 25-30 mm diam.; petals broadly ovate-lanceolate *C. steatoglossum*
Leaves c. 8 mm wide; flowers
c. 35-45 mm diam.; petals narrowly oblanceolate *C. verruciferum*
4. Labellum with distinct lateral lobes, ending in an acute point *C. cymatoleguum*
Labellum with obscure lateral lobes, never acute, the margins continuous with the mid-lobe ... 5
5. Flowers 40-50 mm diam. 6
Flowers 20-35 mm diam. 7
6. Racemes pendulous; flowers cream to white; petals linear *C. fractiflexum*
Racemes erect; flowers olive green to brown; petals obovoid *C. deplanchei*



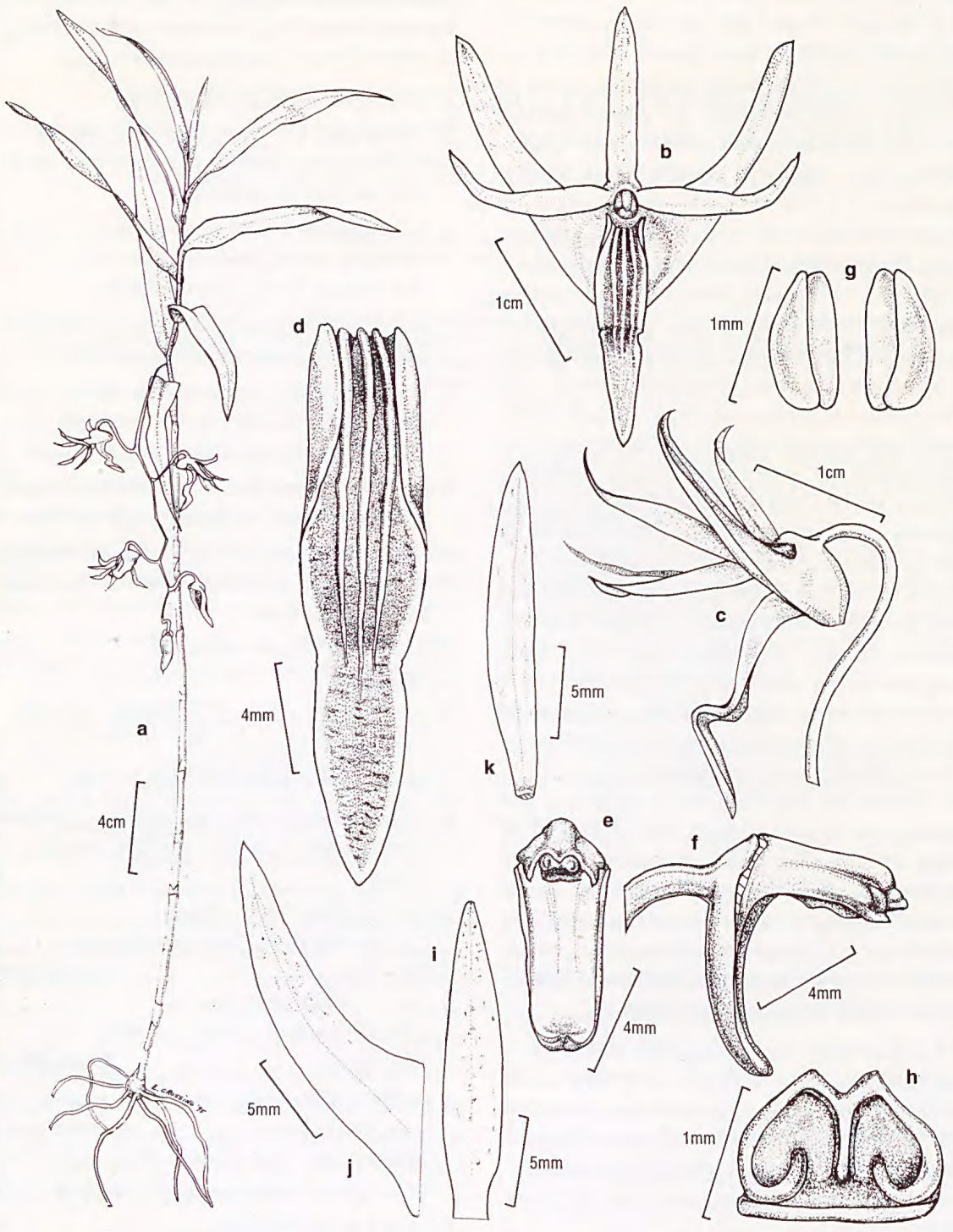


Figure 1. *Cannaeorchis fractiflexum*, road to Yaté, New Caledonia, Clements 7838: **a.** plant: **b.** flower from the front: **c.** flower from the side: **d.** labellum from above: **e.** column from front: **f.** column from side: **g.** pollinium: **h.** anther cap from the front: **i.** dorsal sepal : **j.** lateral sepal: **k.** petal. (Illustration by Lisa Crossing)



1. Maquis scrubland on ultrabasic substrate in southern New Caledonia, the habitat of several species of *Cannaeorchis*.



3. *Cannaeorchis steatoglossum*, Creek Pernod area, Clements 9378



2. *Cannaeorchis verruciferum*, Riviere Blue, Clements 9358



4. *Cannaeorchis polycladium*, forest overlooking Yaté, Clements 9375

7. Labellum margins convolute 8
 Labellum margins entire 9
8. Racemes porrect; flowers about 20 mm diam.;
 leaves to 9 mm wide *C. megalorrhizum*
 Racemes erect; flowers about 30 mm diam.;
 leaves to 15 mm wide *C. sarcochilus*
9. Labellum mid-lobe obovate/
 spatulate *C. vandifolium*
 Labellum mid-lobe ovate 10
10. Plants to c. 0.5 m tall; labellum mid-lobe
 narrowly ovate, papillate *C. atractoglossum*
 Plants to 2 m tall; labellum mid-lobe broadly
 ovate, smooth *C. polycladium*

Species list

1. *Cannaeorchis atractoglossum* (N. Hallé) M.A. Clem. et D.L. Jones, *comb. et stat. nov.*

Basionym: *Dendrobium polycladium* Rchb.f. var. *atractoglossum* N. Hallé, *Flore de la Nouvelle-Caledonie et Dependances* 8: 66-67, t. 21. (1977). Type: Nouvelle-Caledonie: Montagne de Poum, 300m, 8 Nov. 1943, R. Virot 1399 (holo P!; iso AMES!).

ILLUSTRATION: Hallé (1977), t. 21 - as *Dendrobium polycladium* var. *atractoglossum*.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia where known from three well separated sites towards the north; grows as a terrestrial in maquis.

NOTES: This species is characterised by thin stems 20-50 cm tall, 1.5-4 mm diam.; racemes usually one or two flowered (rarely up to five); flowers green-yellow maturing to pale pink; long narrow acute tepals; and long narrowly oblong-elliptical decurved, acute labellum with the ventral surface papillate in the distal half.

Cannaeorchis atractoglossum is allied to *Dendrobium polycladium* Rchb.f. and *D. steatoglossum* Rchb.f. but can be readily distinguished by the slender habit, narrow sepals and narrow acute labellum papillate near the apex.

SPECIMENS EXAMINED: New Caledonia; Massif de Boulinda, alt. c. 720 m, Jaffré 952 (NOU); Plateau au N. de Negropo, alt. c. 600-700 m, 4 Mar. 1973, MacKee 26360 (NOU); Boulinda, alt. c. 500 m, 5 Sep. 1971, Schmid 4026 (NOU); Kopeto versant Nord, alt. c. 600 m, 11 Dec. 1970, Veillon 2218 & 2219 (NOU); Massif du Tchingou pente Sud-Est. RVB avec

colluvion, alt. c. 800 m, Veillon 6145 (NOU).

2. *Cannaeorchis cymatolegum* (Schltr.) M.A. Clem. et D.L. Jones, *comb. nov.*

Basionym: *Dendrobium cymatolegum* Schltr., *Bot. Jahrb.* 39: 75 (1906); *Grastidium cymatolegum* (Schltr.) Rauschert, *Feddes Rep.* 94(7-8): 448 (1983). Type: New Caledonia: Southern District; Between river rubble on the banks of the Ngoye, alt. c. 50m, Nov. 1902, R. Schlechter 15141 (holo B†; iso BM!, HBG!, K!, P!, W!, Z!).

Dendrobium cymatolegum Schltr. var. *major* Schltr., *Bot. Jahrb.* 39: 75 (1906). Type: New Caledonia: Southern District; On the mountains slopes near Ngoye, alt. c. 600m, Nov. 1902, R. Schlechter 15151a (holo B†).

Dendrobium schinzianum Kraenzl., *Neu-Caledonische Orchidaceen, Viertelj. Naturf. Ges. Zürich* 74: 85 (1929); *Grastidium schinzianum* (Kraenzl.) Rauschert, *Feddes Rep.* 94(7-8): 452 (1983). Type: New Caledonia; Mt Humboldt, 9 Nov. 1924, A.U. Däniker 575 (holo Z!).

ILLUSTRATIONS: Hallé (1977), t. 32, 33; Bégaud et al. (1995), p. 68 - both as *Dendrobium cymatolegum*; Hallé (1977), t. 34 - as *Dendrobium cymatolegum* var. *major*.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia where uncommon in southern areas and only found as far north as Mt Humboldt; terrestrial in strand forest or serpentine scrubland (Bégaud et al. 1995).

NOTES: This species is characterised by glaucous sheaths; glaucous light green leaves with a pinkish margin; 3-10-flowered inflorescence which is frequently sparsely paniculate at the first fertile node; reddish-brown flowers with lilac and white markings; and acute apices on the labellum lateral lobes. Plants have canes to 2.5 m tall

"This species is closely related to *Dendrobium sarcochilus* Finet in floral structure, and especially in the labellum. However, it is easily recognised by its smaller foliage, shorter inflorescences and by its labellum. The flowers are brown, with a white crest on the labellum" (Schlechter 1906).

Schlechter distinguished var. *major* by the flowers being a little larger and with a slightly more lax inflorescence. Many species of *Cannaeorchis* are somewhat variable in floral and vegetative morphology and in this case the variation



5. Maquis scrubland at Creek Pernod



7. *Cannaeorchis cymatolegum*, ex Mt Koghis, Ziesing 292



6. *Cannaeorchis steatoglossum*, Clements 9378



8. *Cannaeorchis verruciferum*, near Yaté



9. *Cannaeorchis fractiflexum*, forest overlooking Yaté, Clements 9348



10. *Cannaeorchis fractiflexum*, road to Yaté, Clements 7858





11. *Cannaeorchis deplanchei*, Mt Do



13. *Cannaeorchis cymatolegum*, [var. *major*], near Yaté, Ziesing 118



12. *Cannaeorchis polycladium*, ex forest overlooking Yaté, Clements 9375



14. *Cannaeorchis cymatolegum*, ex Mt Koghis, Ziesing 292

encompasses Schlechter's variety. The type of *C. cymatoleguum* has flowers with three reduced callus ridges (Hallé 1977), whereas the majority of collections have five. Since the type of var. *major* has been destroyed, and Schlechter makes no mention of any additional ridges in the protologue, then it cannot be assumed that his varietal name refers to that entity.

SPECIMENS EXAMINED: New Caledonia; col de Plum, route de la R. des Pirogues, 28 Oct. 1970, Jaffré 413 (NOU); plaine des Lacs, vallée de Creek Pernod, alt. 200 m, 18 July 1976, Aymard (MacKee 31605) (NOU); Road de Yaté, Les Dalmates, 25 May 1986, MacKee 43120 (NOU); Montagne des Sources, alt. c. 900 m, 22 July 1988, MacKee 44006 (NOU); S. du Kuébini, 18 Aug. 1970, Schmid s.n. (NOU); Montagne des Sources, 5 Oct. 1967, Veillon 1383 (NOU); Montagne des Sources, piste de Case-Cou, alt. c. 750 m, 11 July 1972, Veillon 2670 (NOU); Bord de Lac en Y, 3 Aug. 1972, Veillon 2671 (NOU); Mt Koghis, Nov. 1992, Villegente (Ziesing 292) (CANB 9217961); cultivated ANBG, 14 May 1993 ex New Caledonia; Noumea to Yaté road, between turn-off to Chutes de la Madeleine and Col du Yaté, Nov. 1992, Ziesing 118 (CANB 9217787).

3. *Cannaeorchis delumbe* (Kraenzl.) M.A. Clem. et D.L. Jones, comb. nov.

Basionym: *Dendrobium delumbe* Kraenzl., *Viertelj. Naturf. Ges. Zürich* 74: 84 (1929). Type: New-Caledonien; Koniambo near Koné, 18 Jan. 1925, A.U. Däniker 927a (holo Z!).

ILLUSTRATIONS: None found.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia where at present known only from the type locality; terrestrial in maquis.

NOTES: This species is characterised by one or two-flowered inflorescence; a prominent curved mentum; broadly linear obtuse dorsal sepal; linear slightly curved petals; and a porrect fleshy spathulate labellum which is thickest along the margins of the midlobe.

Kraenzlin (1929) distinguished the species as "Labellum undivided, spathulate, lateral lobes almost nil, the margins obscure and wrinkled, thick, fleshy, and a fleshy disc with three prominent ridges. The flowers are white".

Hallé (1977) treated this species as a synonym of

D. polycladium but examination of the types shows the two to be florally distinct. Flowers of *D. delumbe* have a prominent curved mentum, linear petals and a spathulate labellum. In *D. polycladium* the mentum is relatively obscure, short and nearly straight, the petals widen slightly near the middle and the labellum is narrowly oblong.

A collection by Veillon 3525, Kouaoua: decharge Montmartre, 14 Feb. 1978 (NOU) has some features similar to *D. delumbe*, including a spathulate labellum, but there are up to three flowers per inflorescence, the flowers are slightly larger, sepals and petals are longer and more acute and the labellum margins slightly crenulate. This may represent a new taxon but further collections from northern areas in New Caledonia are needed before an accurate assessment can be made.

4. *Cannaeorchis deplanchei* (Rchb.f.) M.A. Clem. et D.L. Jones, comb. nov.

Basionym: *Dendrobium deplanchei* Rchb.f., *Linnaea* 41: 90 (1877); *Grastidium deplanchei* (Rchb.f.) Rauschert, *Feddes Rep.* 94(7-8): 448 (1983). Type: Nova Caledonia, 1863, M. Deplanche 162 (holo W!; iso P!).

ILLUSTRATION: Hallé (1977), t. 17, 18 - as *Dendrobium deplanchei*.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia; terrestrial in leaf litter of *Araucaria* and *Nothofagus* montane forest above 750 m.

NOTES: This species is characterised by robust and coarse habit; slightly flattened stems 3-5 m long; leaves to 25 x 3 cm; obovate-lanceolate obtuse sepals to 20 x 8 mm; petals similar but slightly narrower at the base, to 18 x 5 mm; and a slightly spathulate labellum 16 x 5 mm, with prominently incurved margins and a cymbiform apex. The stems sometimes scramble amongst small shrubs or along the ground. The flowers are brown to olive green or pale yellow.

TYPIFICATION: Hallé (1977) believed that the holotype was in Paris but it is in the Reichenbach herbarium at Vienna. Two sheets are annotated as *D. deplanchei* in Reichenbach's hand and from this material it is clear that Reichenbach used both collections when describing the species, although he only cited the Deplanche collection in the protologue. The Deplanche collection (no. 162) consists of a leaf, three flowers in a packet, and a



sketch of the source collection in Paris. The second is a Veillard collection (no. 1327) which consists of a sketch of the collection in Paris, three flowers in a packet and a flattened labellum. Attached at the top right hand corner of the sheet is a card with sketches showing a flower from the side, a side view of the column, anther cap top and underside views and a flattened labellum as well as the original hand written description and citation of both "Veillard 1327" and "Deplanche 162". The sketch of the flattened labellum corresponds to the material in the packet on the same sheet.

SPECIMENS EXAMINED: New Caledonia; Mé Maoya E, alt. c. 1000 m, 14 Jan. 1970, Schmid 3027 (NOU); Mine de Pouvray, N'Goye, alt. c. 700 m, 2 June 1982, Suprin 1869 (NOU); Montagne des Sources, sentier à flanc de montagne, alt. c. 900 m, 10 Mar. 1965, Veillon 84 (NOU); Montagne de M'bee, 1855-60, Vieillard 1327 (W).

5. *Cannaeorchis fractiflexum* (A. Finet) M.A. Clem. et D.L. Jones, *comb. nov.*

Basionym: *Dendrobium fractiflexum* A. Finet, *Bull. Soc. Bot. France* 50: 377, t. 13, f. 27-39 (1903); *Grastidium fractiflexum* (A. Finet) Rauschert, *Feddes Rep.* 94(7-8): 449 (1983). Type: 'Nouvelle-Caledonie: Baie de Tupiti, sommet des montagnes', 1861-67, M. Deplanche 529 (holo P!; iso K!, W!).

Dendrobium fractiflexum A. Finet var. *micranthum* Guillaumin, *Mem. Mus. Nat. Hist., Paris* (ser B) 8(1): 35 (1962). Type: New Caledonia; forest at base of mountains N. of Kouebuni (Goro), alt. c. 120 m, 10 Jan. 1951, H. Hurlimann 600 (holo & iso Z!), *syn. nov.*

ILLUSTRATIONS: Finet (1903), t. 13, f. 27-29; Hallé (1977), t. 9, 10 - both as *Dendrobium fractiflexum*.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia; terrestrial in wetter areas in more open forest and along creeks in dense rainforest.

NOTES: This species is readily recognised by its long pendent multiflowered (4-12 flowers) inflorescences with a flexuose rachis, and nodding flowers with acute to acuminate segments. The flowers, which are white with pink suffusions, are covered internally with dark brown glandular secretions. The plants, which can grow to more than 2 m tall, also have green sheaths; spreading thick broad light green leaves which are paler on the underside; lamina twisted at the base and forming a

flat plane and with a basal abscission layer; abaxial surface with a distinct midrib and six other main veins; acute, obliquely bifid apex; labellum lanceolate, grooved apically; anther lobes channelled; stigma cordate; and rostellum large and plate-like.

A variant has been collected from near Yaté which requires further study. It has crowded flexible narrow dark green leaves which have red margins; a barely discernible red midrib and lateral main veins; acuminate and minutely bifid apex; dark green and red sheaths; a short pendent inflorescence, slightly flexuose in the rachis; nodding white flowers with pink suffusions, internally covered with minute dark brown glandular secretions; and a lanceolate labellum which is sometimes sigmoid.

The variety *micranthum* was distinguished by having smaller flowers (2 cm rather than 3 cm long), but in all other respects it appears identical and the type is very similar to the type of *D. fractiflexum*. Although distinctive, *D. fractiflexum* is variable especially in vegetative morphology and further study of this variation is warranted.

SPECIMENS EXAMINED: cultivated ANBG, 23 Jan 1995 ex New Caledonia; c. 10 km along road to Yaté, 21 Aug. 1992, Clements 7838 (CANB 9212973); Kuakue, alt. c. 500 ft, 10 May 1914, Compton 897 (BM); below Yaté Dam, alt. 300 m, 9 Nov. 1988, Cribb s.n. (K); Col de Plum, 28 Oct. 1979, Jaffré 412 (NOU); Prony, alt. c. 150 m, 4 June 1979, MacKee 36966 (K); Port Boise, 6 July 1977, Morat 5581 (NOU); *loc. cit.*, 6 July 1977, Morat 5582 (K); New Caledonia, 1886, Roberts s.n. (HBG); cultivated ANBG, 18 Oct. 1996, Mt. Dore Rd, mountain opposite Fontaine du Col de Plum, 8 Nov. 1992, Ziesing 97 (CANB 9217766).

6. *Cannaeorchis megalorhizum* (Kraenzl.) M.A. Clem. et D.L. Jones, *comb. nov.*

Basionym: *Dendrobium megalorhizum* Kraenzl., *Viertelj. Naturf. Ges. Zürich* 74: 85 (1929); *Dendrobium sarcochilus* A. Finet var. *megalorhizum* (Kraenzl.) N. Hallé, *Flore de la Nouvelle-Caledonie et Dépendances* 8: 53 (1977); *Grastidium megalorhizum* (Kraenzl.) Rauschert, *Feddes Rep.* 94(7-8): 450 (1983). Type: "Neu-Caledonien: Plateau des Tiebaghi", 16 Mar. 1925, A.U. Däniker 1474 (lecto Z!; isolecto Z!, *vide* Hallé 1977).

ILLUSTRATION: None found.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia where terrestrial or occasionally epiphytic on the base of shrubs in low maquis scrubland on ferric or serpentine soils.

NOTES: This species is sometimes treated as a variety of *Dendrobium sarcochilus* Finet (Hallé 1977), but the two are readily distinguished by their habit and flowers. *Cannaeorchis megalorhizum* has slender canes, narrow linear-lanceolate leaves with acute apices (10-12 x cm x c. 8-9 mm), a fewer flowered (2-6 flowers) porrect inflorescence and thin convolute raised margins on the labellum mid-lobe. The flowers are dull yellow, the labellum brighter.

SPECIMENS EXAMINED: New Caledonia; Ile Art, secteur Sud, 9 Dec. 1978, Jaffré 1634 (NOU); Ile Art. plateau S., 24 Aug. 1978, Veillon 3700 (NOU); Mt. Boulinda, alt. c. 500 m, 9 July 1975, Veillon 15361 & Schmid (NOU); Sommet du douce de la Tiébaghi, alt. c. 600 m, 27 Oct. 1993, Viro 1394 (NOU).

7. *Cannaeorchis polycladium* (Rchb.f.) M.A. Clem. et D.L. Jones, comb. nov.

Basionym: *Dendrobium polycladium* Rchb.f., *Linnaea* 41: 90 (1877); *Grastidium polycladum* (Rchb.f.) Rauschert, *Feddes Rep.* 94(7-8): 452 (1983). Type: 'Nova Caledonia', [Isle of Pines], Aug. 1861, M. Deplanche 156 (holo W!; iso P!).

ILLUSTRATION: Hallé (1977), t. 19, 20 - as *Dendrobium polycladium*.

DISTRIBUTION AND ECOLOGY: New Caledonia, southern areas including the Isle of Pines; terrestrial growing in maquis scrubland or forest.

NOTES: This species is characterised by tall habit (canes to 2 m); narrow-lanceolate leaves which are often purple; multiflowered (3-9 flowers) pendulous inflorescence with a straight rachis; acute perianth segments; obscure, short nearly straight mentum; and a white labellum with an ovate, smooth mid-lobe.

Hallé (1977) reduced *D. delumbe* to a synonym of *D. polycladium* but the two are distinct. The type of *D. delumbe* has a pronounced curved mentum, a broadly spatulate labellum and a short two-flowered inflorescence.

The flowers of *C. polycladium* are recorded as greenish white, cream, pale pink or pure white, the labellum lighter or white. Colour changes with age

have been observed in cultivated plants from greenish cream with a cream labellum to light pink on the sepals, cream on the inner surface and a white labellum. These changes could account for the range of flower colour reported for this species. Further research is needed on the variation exhibited by this species. In New Caledonia it is commonly referred to as the "White-caned dendrobe" (S. MacCoy, pers. comm.).

TYPIFICATION: The type of *D. polycladium*, which was collected on the Isle of Pines, consists of a stem apex, one inflorescence with three buds, a solitary dissected flower (which may be from an opened bud), a sketch of the original specimen, sketches of a bud, petal, column from the side and labellum from above and the original hand written description. Reichenbach's protologue describes the flower as having a short, obtuse, angular mentum and a ligulate labellum.

SPECIMENS EXAMINED: New Caledonia; Iles des Pins, slopes at summit of Pic Nga, alt. 100-260 m, 5 Aug. 1956, MacKee 5045 (K); Plaine des Lacs, NE du Grand Lac, 250 m, 30 Dec. 1978, MacKee 36291, 36293 (K, NOU); Plaine des Lacs, SE. de la chute, 4 Dec. 1980, Suprin 967 (NOU).

8. *Cannaeorchis sarcochilus* (A. Finet) M.A. Clem. et D.L. Jones, comb. nov.

Basionym: *Dendrobium sarcochilus* A. Finet, *Bull. Soc. Bot. France* 50: 376, t. 13, f. 14-26 (1903); *Grastidium sarcochilum* (A. Finet) Brieger in Schltr., *Die Orchideen* (ed. 3) 1(11-12): 653 (1981). Types: 'Nouvelle-Caledonia: Collines herbeuses a la base de la Table Unio', 1869, M. Balansa 2386 (syn P!); 'Nouvelle-Caledonie', Pancher 3307 (syn P).

ILLUSTRATIONS: Finet (1903), t. 13, f. 14-26; Hallé (1977), t. 13, 14 - both as *Dendrobium sarcochilus*.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia, growing in maquis forest mainly in the south of the main island.

NOTES: This species is characterised by tall habit (canes to 5 m); broadly lanceolate leaves (11-13.5 cm x 12-18 mm) with an obtuse apex; erect multiflowered (5-16 flowers) inflorescence with a straight rachis; obtuse perianth segments; and light yellow flowers with a red markings on the labellum. It is closely allied to *Dendrobium megalorhizum* Kraenzl.



(Hallé 1977) but the two are readily distinguished by their habit.

SPECIMENS EXAMINED: New Caledonia; Vallée de Kouakoue, alt. c. 10-100 m, 11 Nov. 1973, MacKee 27785 (NOU); Hte. Ouinne, alt. c. 500 m, 18 Nov. 1976, MacKee 32277 (K); Baie de Ouinné, alt. c. 50 m, 27 Dec. 1975, MacKee 32530 (NOU); Canala, Me Aiu, alt. c. 700 m, 23 Nov. 1990, MacKee 45181 (NOU); Poro, Kaseoua, alt. c. 500 m, 17 Dec. 1992, MacKee 46069 (NOU); auf den Hügeln am Ngoye, alt. c. 150 m, 28 Nov. 1902, Schlechter 15132 (BM, K).

9. *Cannaeorchis steatoglossum* (Rchb.f.) M.A. Clem. et D.L. Jones, *comb. nov.*

Basionym: *Dendrobium steatoglossum*. Rchb.f., *Linnaea* 41: 88 (1877); *Grastidium steatoglossum* (Rchb.f.) Rauschert, *Feddes Rep.* 94(7-8): 453 (1983). Types: Nova Caledonia, Vieillard 1337 (lectotype W!, here designated). Syntype: Nova Caledonia, 1861, Deplanche 164 (syn P!).

ILLUSTRATIONS: Hallé (1977), t. 11, 12; Bégaud et al. (1995), p. 85 - both as *Dendrobium steatoglossum*.

DISTRIBUTION AND ECOLOGY: New Caledonia; growing in maquis forest mostly in the south of the main island.

NOTES: This species is characterised by tall bamboo-like stems (to 5 m or more); inflorescences of one or two flowers; and small pale yellow or greenish-yellow flowers with a paler labellum.

The stems of this species are unable to support their own weight and bend readily. They are often bare for all but the top 15-25 cm, and as such blend in with the branches of surrounding shrubs and small trees. The insignificant flowers are well hidden amongst the leaves.

This species and *C. verruciferum* commonly inhabit open maquis on exposed areas of ultrabasic soils in the southern part of New Caledonia.

TYPIFICATION: The lectotype is chosen from amongst the syntypes because it represents the main collection in the Reichenbach Herbarium at Vienna, including illustrations of the plant and flower, and the hand written original description of the species.

SPECIMENS EXAMINED: New Caledonia; c. 80 km E. of Noumea on road to Yaté, River Pernod, 6 Dec. 1989, Clements 5653 (CANB 8916295); Plaine des

Lacs, alt. c. 250 m, 20 Oct. 1914, Franc 2009 (BM, K); Haute Kuebini near Lac en Long, alt. c. 150 m, 6 May 1964, MacKee 11314 (K); Prony; le Carenage, alt. c. 100 m, 11 Dec. 1977, MacKee 34353 (CANB 8908105, K, NOU); Plaine des Lacs, alt. c. 250 m, 30 Dec. 1978, MacKee 36283 (K, NOU); Col de Prony, alt. c. 300 m, 4 June 1979, MacKee 36960 (K); Plaine des Lacs, NE. of Grand Lac, alt. c. 250 m, 4 June 1979, MacKee 36981 (K); Hauteurs de Yaté, alt. c. 250 m, 21 Apr. 1985, MacKee 42566 (K); Au SE. de la Chute, Plaine des Lacs, 3 Nov. 1980, Suprin 957 (NOU); Plaine des Lacs, Bord du Lac en Y, 14 Mar. 1972, Veillon 2536 (NOU); Chutes de la Madeleine, 7 Nov. 1992, Ziesing 91 (CANB).

10. *Cannaeorchis vandifolium* (A. Finet) M.A. Clem. et D.L. Jones, *comb. nov.*

Basionym: *Dendrobium vandaefolium* A. Finet, *Bull. Soc. Bot. France* 50: 375, t. 13, f. 1-13 (1903); *Grastidium vandifolium* (A. Finet) Rauschert, *Feddes Rep.* 94(7-8): 453 (1983). Type: 'Nouvelle-Caledonie: ile Art', June 1871, Balansa 3117 (holo & iso P!).

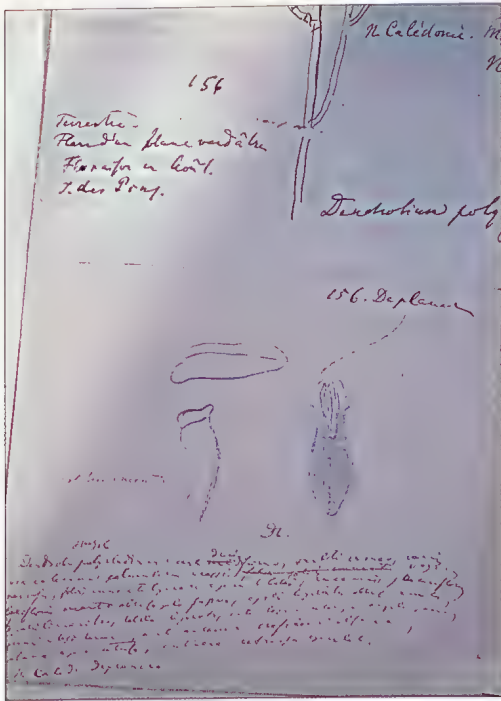
ILLUSTRATIONS: Finet (1903), t. 13, f. 1-13; Hallé (1977), t. 15, 16; Bégaud et al. (1995), p. 86 - all as *Dendrobium vandifolium*.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia, growing in maquis forest in the north of the main island and on some off-shore islands.

NOTES: This species is characterised by tall habit (to 4 m); crowded, conduplicate, arcuate, ligulate leaves; and multi-flowered (10-40 flowers), drooping inflorescence. The flowers are greenish or pale yellow with a white labellum.

Cannaeorchis vandifolium exhibits a degree of variation which warrants further study. Four variants are apparent from herbarium collections:-

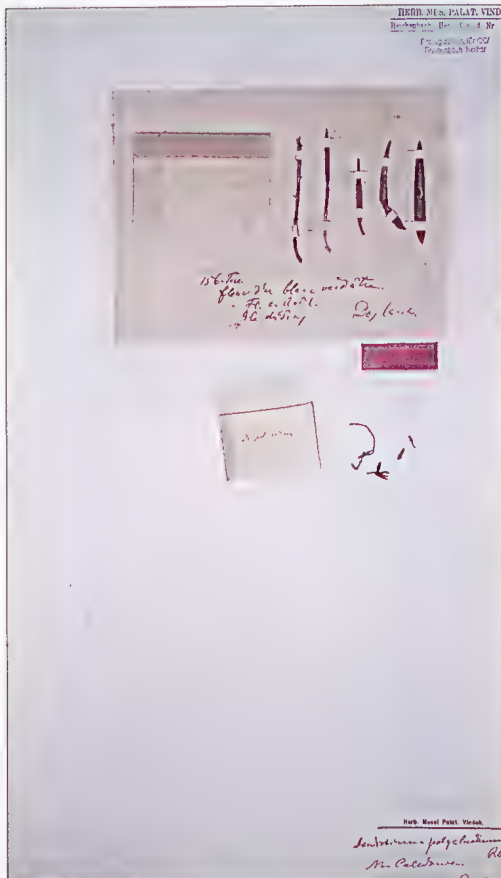
- 1). The typical variant has relatively thin stems to 2 m tall and c. 7-8 mm diam.; slightly erect leaves, 15-20 cm x 15 mm; inflorescence not thickened basally, with bracts 8-10 cm long; racemes of 10-20 well-spaced flowers on pedicels 15-20 mm long; lanceolate sepals; obliquely lanceolate acute petals; and a spatulate labellum. Detailed illustrations of part of the floral parts are presented in Hallé (1977), t. 16, f. 1,4,5.
- 2). Plants of this variant have stems 3.5-4 m tall and 8-14.5 mm diam; porrect leaves 10-12 cm x 20-30 mm; inflorescence thickened at the base



15. Part of the holotype of *Dendrobium polycladium* at Vienna (W)



17. Isotype of *Dendrobium deplanchei* at Paris (P)



16. Part of the holotype of *Dendrobium polycladium*, at Vienna (W)

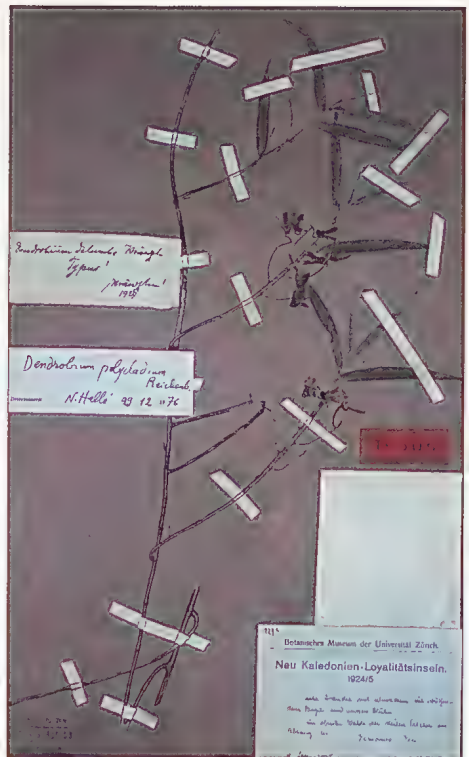


18. Holotype of *Dendrobium deplanchei* at Vienna (W)

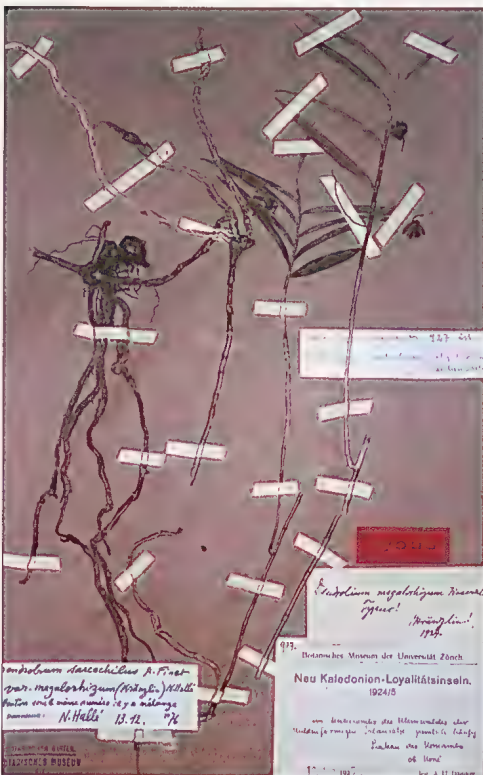




19. Holotype of *Dendrobium sacrochilus* at Paris (P)



21. Holotype of *Dendrobium delumbe* at Zürich (Z)



20. Holotype of *Dendrobium megalorhizum* at Zürich (Z)



22. Holotype of *Dendrobium fractiflexum* var. *micranthum* at Zürich (Z)



23. Holotype of *Dendrobium vandifolium* at Paris (P)



24. Holotype of *Dendrobium polycladium* var. *attractoglossum* at Paris (P)



with 5-7 basal bracts 8-15 cm long; racemes of 25-40 clustered flowers on pedicels 17-23 mm long; sepals and petals similar to the typical variant; and narrow spatulate labellum. This variant is illustrated in Bégau et al. (1995) and has been collected at Koniambo and Tiébaghi.

- 3). This variant from relatively low elevations near Koniambo has stems to 1.6 metres tall and 7-9 mm diam.; distinctly drooping leaves, 12-13 cm x 16-18 mm; sparser inflorescence than the typical, 7-17 cm long with one or two basal bracts and one or two stem bracts; racemes of 9-30 slightly larger flowers; triangular acute sepals; narrowly lanceolate petals; and a spatulate labellum with an acute apex.
- 4). This variant, collected on Mt Kaala, is closest to the type in habit and floral features but with linear petals which are slightly oblique near the apex.

SPECIMENS EXAMINED: New Caledonia; cit. loc., Hook s.n. (NOU); Massif du Koniambo, 1 June 1972, Jaffré 755 (NOU); cit. loc., alt. c. 200 m, 25 Aug. 1987, Jaffré 2867 (NOU); Plateau du Dôme de Tiebaghi, alt. c. 500 m, 17 Oct. 1969, MacKee 21023 (K, NOU); Koumac, Tongadiuo, alt. c. 20 m, 6 Mar. 1972, MacKee 25145 (K, NOU); Pouembout, Tia (Pente Ouest), alt. c. 200 m, 25 Feb. 1975, MacKee 30311 (K); Poya, Nekoro, alt. c. 200 m, 21 May 1977, MacKee 33200 (NOU); Koumac, Siounda, alt. c. 150 m, 1 July 1982, MacKee 40595 (K); Poum, alt. c. 350 m, 9 Sep. 1982, MacKee 40782 (K); Koumac, Chagrin, alt. c. 300 m, 10 Sep. 1982, MacKee 40799 (K); Plateau de la Tiebaghi, alt. c. 600 m, Schmid 1483 (NOU); cit. loc., alt. c. 500 m, 17 Oct. 1970, Schmid 3457 (NOU); Iles de Yande, alt. c. 80 m, 23 Aug. 1978, Tirel 1240 (K).

11. *Cannaorchis verruciferum* (Rchb.f.) M.A. Clem. et D.L. Jones, comb. nov.

Basionym: *Dendrobium verruciferum* Rchb.f., *Linnaea* 41: 88 (1877). Types: 'Nova Caledonia' Mt. Unia, 1855-60, Vieillard 1291 (syn W!; isosyn P!); 'Nova Caledonia', 1861, M. Deplanche 157 (syn W!; isosyn P!).

ILLUSTRATIONS: Hallé (1977), t. 22, 23; Bégau et al. (1995), p. 87 - both as *Dendrobium verruciferum*.

DISTRIBUTION AND ECOLOGY: Endemic to New Caledonia, growing on chromium-rich rock in low

maquis forest, mainly in the south of the island, with an outlying population in the north at Poum.

NOTES: This species is characterised by the slender growth habit, solitary (rarely two), porrect flowers, narrow oblong-lanceolate, spreading, red-brown or green tepals, and a thick green or yellowish-green pendent labellum. It often grows on exposed ultrabasic rock formations in full sun and is one of the commonest species in southern New Caledonia.

Plants from the northern isolated population near Poum have broader leaves clustered together near the apex and slightly fleshier flowers. Further study of this northern population appears warranted.

TYPIFICATION: The type sheet in Vienna includes both syntypes with the Deplanche collection being the more complete. Since there is no confusion about the identity of these two collections and each appears to have been used equally in the description of the species, there seems little advantage in selecting a lectotype.

SPECIMENS EXAMINED: New Caledonia; road to Yaté, 11 Dec. 1989, Clements 5653 (CANB); Presqu' Il Bogota, alt. c. 1500 ft., 25 June 1914, Compton 1321 (BM); Prony, Mar. 1914, Franc 1804a (K); Plaine de Lacs, secteus compement Penamax, 15 July 1974, Jaffré 1334 (NOU); Golone, région de Poum, 15 Nov. 1976, Jaffré 1798 (NOU); Poum, Golone, alt. c. 80 m, 14 Apr. 1972, MacKee 25288 (K, NOU); Vallée de la Ouinne, alt. c. 50 m, 25 May 1974, MacKee 28703 (K); Yaté, Plateau au sud du Village, alt. c. 300 m, 1 Jan. 1975, MacKee 29654 (K); Plateau de la Chute, 9 Feb. 1966, Veillon 633 (NOU); Au SE. de la Rivière des Pirogues au dessus de la Mine Bien-Sûr, alt. c. 200 m, 7 June 1967, Veillon 1229 (NOU); Plaine de Lacs, environ 1 km après le "Tron", alt. c. 150 m, 21 May 1968, Veillon 1786 (NOU); Chutes de la Madeleine, 7 Nov. 1992, Ziesing 96 (CANB 9217765).

Excluded species

Dendrobium virotii Guillaumin, *Not. Syst.* 10(2): 59-63 (1941); *Grastidium virotii* (Guillaumin) Rauschert, *Feddes Rep.* 94(7-8): 453 (1983). Type: Nouvelle-Caledonie, Monte Boulari, Camp No. 3, Jun 1938, Virot s.n. (holo P!).

Notes: This species was treated by Rauschert (1983) as a *Grastidium* as were most species of *Cannaorchis*. It

is neither a *Grastidium* nor *Canneorchis* and its status is the subject of a separate study.

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